Tri-Carb 2800TR
Low Activity Liquid Scintillation Analyzer

Description

The Tri-Carb® 2800TR LSA is a computer-controlled benchtop liquid scintillation analyzer for detecting small amounts of alpha, beta and gamma radioactivity.

Tri-Carb 2800TR

Standard Instrument Features

- **QuantaSmart™ software for the Windows® XP operating system** is a 32-bit operating system software that provides a robust multitasking and easy networking environment and unlimited assays in a secure multiuser environment.
- **Hypertext on-line comprehensive HELP** provides context specific help for every screen and data entry field.
- **Powerful integrated computer system control** with 256 MB RAM and 20 GB hard disk (minimum) with a 17-inch SVGA monitor, built-in CD ROM and 3.5 inch floppy disk drive.
- **Robust downloading sample changer mechanism** with a double light sealing shutter, allows the photomultiplier tube detectors to remain on for maximum stability even during sample changing.
- **Patented TR-LSC® (Time-Resolved Liquid Scintillation Counting)** is featured for high sensitivity, low background counting of LS samples. TR-LSC increases sample throughput and reduces cocktail consumption.
- **Multi-parameter linear MCA (Multichannel Analyzer)** with an effective resolution of 1/10 keV, offers an extended dynamic quench range and provides multi-parameter spectrum analysis to correct for luminescence, color quenching and background radiation.
- **SpectraBased counting and data management system** provides regionless counting and storing of complete spectra for all samples and standards. Features include automatic recall of spectra stored in the quench library for region independent quench correction and allows post-processing of sample data with the optional Replay™ feature.
- **A cassette-loaded bi-directional sample conveyor mechanism** is standard with a sample capacity of either 408 standard 20 mL vials, or 720 small 4 or 7 mL vials depending upon configuration purchased.
- **Positive sample identification** provides protocol number, cassette number, sample number, and user-selectable printout and data file storage of the counting time and date for each sample.
- **Quick-Count sample loading** for 15 independent protocols (with unlimited assays) provides unrestricted access to sample changer and protocol selection plugs. Sample batches are processed by simply activating the Quick-Count protocol plugs, thus minimizing any user programming.

PerkinElmer® precisely.

- **Auto QA (Automatic Quality Assurance)** automatically prints reports for backgrounds, efficiencies, E^2/B, and Chi-square values for both ^{3}H and ^{14}C including the date and time for each test. Auto QA results may be transmitted via RS-232 for archiving.
- **SIS (Spectral Index of Sample) quench indicating parameter** determines counting efficiency by analysis of sample spectrum.
- **^{133}Ba low energy external standard source and tSIE (transformed Spectral Index of External standard) calculations** eliminate the effects of vial glow, plastic wall and cocktail changes on the DPM results. The use of integral spectrum counts eliminates the need for repeat counting of the external standard and negates the effect of isotope half-life on quench monitoring accuracy and precision. The ^{133}Ba external standard is centered under the sample vial which eliminates the affects of volume variations and assures reproducible quench monitoring for the life of the instrument.
- **Luminescence detection and reporting** with percent luminescence is flagged on printout to alert user of possible sample problems.
- **Enhanced Direct DPM (Disintegrations Per Minute)** technique determines the DPM of any single label pure beta or beta/gamma radionuclide in any cocktail without the need to store quench standards.
- **Live SpectraView™ automatic spectrum display** aids in optimizing counting conditions and helps evaluate complex sample situations. It allows setting temporary regions on the spectrum screen and enables the operator to monitor the effect of AEC while the sample is counting.
- **Automatic spectrum plot** (on demand) per sample allows spectral documentation of samples.
- **Password protection** prevents unwanted changes to saved assays.
- **Printed header contains instrument serial number, user ID, and drive and path of stored data.** Each printed page or RTF (Rich Text Format) file report is numbered and dated for GLP compliance.
- **Assay-specific, user selectable, coincidence resolving time** enables optimized counting of any fast or slow, liquid or solid scintillator, for SPAs (Scintillation Proximity Assays), solid scintillation filters and the newer liquid scintillation cocktails.
- **On-screen editing** of quench correction curves and recording of date last modified is present.
- **Electrostatic controller** automatically helps neutralize static electricity on all types of vials.
- **Automatic processing of count data to final results** provides automatic, protocol specific data processing for all user applications, including commercial or user-generated software. No exporting of data to off-board storage devices or computers is required.
- **Spectral unfolding** separates and displays the individual radionuclide spectra of dual label samples in color (requires color-corrected dual label DPM option).
- **3D (three-dimensional) spectral mapping** displays in color the quench standard spectra together with the spectrum of the unknown for single label DPM counting (requires color corrected dual label DPM option).
- **Half-life correction to any date and time** is available for up to three radionuclides.
- **Activity Reporting** is provided in Becquerels, microcuries, or picocuries.
- **Custom output formatting to printer, RS-232 and disk storage** for each protocol provides almost unlimited flexibility in data reporting. Electronic data can be saved to disk in ASCII, RTF, Lotus® or Microsoft® Excel ready formats.
- **User-definable calculations** are available for custom data reporting.
- **Background subtraction** can be nominated via sample, entered value or stored IPA background spectrum.
- **Programmable single photon counting** enables luminescence assay counting with optimized signal-to-background ratios. It overcomes problems associated with excessive luminescence.
- **Preset time (up to 9,999.99 minutes) and preset error coincidence termination** optimizes counting accuracy in the three counting regions.
- **Percent of standard calculations** for single, dual and triple label samples is present.
- **User adjustable assay-specific sample precount delay** permits dark adaptation of samples before counting.
- **Group PrioStat™ interrupt mode** gives priority counting status to a batch of samples counted according to any stored protocol conditions. It automatically restores the interrupted protocol upon completion and stores PrioStat data for immediate viewing. Data is printed at protocol termination.
- **Automatic electronic data storage** to a default results folder in addition to a user-defined path prevents unwanted data loss.
- **Anti-jam recovery** of the sample changer mechanism protects samples, vials and the counting system from damage if obstructions occur.
- **Automatic power-fail recovery** restarts counting when power is restored and the instrument has reinitialized itself.

- **Computer-aided diagnostics** are used to verify all system functions.
- **Decay computations** automatically calculate decay corrected DPM values for commonly used radionuclide standards.
- **Date and time clock** provides real time display and time-stamped printouts; battery supported.
- **Maneuverable CRT support arm** provides optimal positioning of the CRT monitor and conserves bench space.
- **Inkjet color printer** is standard.

Options

- **17 inch LCD monitor** provides excellent resolution and large viewing area for on screen editing.
- **Single/Dual/Color DPM** includes factory stored quench standards for ^{3}H and ^{14}C.
- **Varisette™ sample changer** enables intermixing and counting of both large and small sample vials without special adapters. Option includes both large vial (12-position) and small vial (18 position) cassettes.
- **60-user protocol option** upgrades the 2800TR to allow for 60-user programming capability.
- **Enhanced Replay sample post-processing** provides complete recall and post-processing of historical count data to eliminate sample recounting. It enables changes to count conditions and reports as well as execution of user application software for optimization of data analysis.
- **Enhanced IPA™ (Instrument Performance Assessment) database** for monitoring efficiencies, backgrounds, E^2/B and Chi-square values for ^{3}H and ^{14}C over the life of the instrument. IPA flags impending problems and provides both running mean and fixed baseline charts and associated tables for retrospective quality control and pro-active system maintenance. Baseline acquisition is programmable for increased flexibility. IPA data may also be transmitted to an external computer via RS-232 or saved to disk for archiving instrument performance. The most recent IPA time and date stamped data are available on demand for reporting purposes. Each IPA printout includes Instrument model, serial number, software version number and calibration standard information.
- **HSCM (High Sensitivity Count Mode)** increases system sensitivity by implementing additional electronic background reduction via TR-LSC. It includes assay specific, user-selectable delay before burst settings for optimization of TR-LSC.
- **Sample worklist** enables entry, editing and review of worklists for each assay. This allows sample identification by user-specific codes for sample printouts and data files.
- **Triple-label DPM** is based on tSIE/AEC for accurate spill correction. Requires Single/Dual/Color DPM option.
- **Chemiluminescence correction with response normalization** corrects for luminescence interferences to speed up sample counting. Response normalization of the correction circuits eliminates the effect of component drift on the corrected results.
- **Ethernet adapter kit** includes an Ethernet card, internal cabling and connector panel. It provides simple connection to networks. The customer must supply and install network software driver.
- **SpectraWorks™ spectrum analysis software for the Windows operating system** analyzes beta, alpha, and gamma spectra and provides simultaneous display for up to four spectra in stacked or overlaid mode. It features zooming to any part of the spectrum; six regions of interest; display of counts or CPM and linear or log spectra; provides automatic and manual scaling; calculates E^2/B, MDA, peak resolution; allows adding and subtracting of spectra and multiplication and division by constants.
- **Temperature-controlled refrigeration** establishes and maintains optimum counting conditions for a wide variety of sample types.

Accessories

- **Instrument utility cart:** functionally designed general purpose laboratory cart. Supports any PerkinElmer benchtop system.
- **Cassette carrying basket:** to accept ten large vial or 12 small vial cassettes. Designed for easy stacking.
- **See the Equipment, Chemicals & Supplies section** in the PerkinElmer catalog.

Physical Data

Dimensions:	Height:	18.5 in.	(47 cm)
	Width:	40.5 in.	(103 cm)
	Depth:	32 in.	(81 cm)
Weight:	477 lb	(217 kg)	
	[523 lb	(238 kg) with refrigeration]	
	Shipping weight: approximately 700 lb (318 kg)		
Electrical Requirements:	117 Vac + 10%, 50/60 Hz, 20 amp protection		
	220 Vac + 10%, 50/60 Hz, 10 amp protection		
	3-prong grounded plug, 500 watts		
Power Consumption:	<900 VA; 1150 VA with temperature control option		
Environmental:	Operating ambient temperature 15 to 35°C (59 to 90°F)		
	Operating relative humidity 30% to 85%		

Typical Performance Data

(As measured in factory at Downers Grove, Illinois)

Energy Range: 0-2,000 keV

Efficiency, Normal Count Mode:

		Minimum Acceptable
^{3}H	0-18.6 keV	60%
^{14}C	0-156 keV	95%

Figure of Merit (E^2/B), Normal Count Mode (NCM):

^{3}H	1-18.6 keV	180
^{14}C	4-156 keV	380

Figure of Merit (E^2/B),
Low Activity/High Sensitivity Count Mode (HSCM):

^{3}H	1-12.5 keV	300
^{14}C	14.5-97.5 keV	950

Observed Background, NCM:

		Average
^{3}H	0-18.6 keV	17.3 CPM
^{14}C	0-156 keV	24.3 CPM

Note: The efficiencies, backgrounds, and E^2/B values for the Normal Count Mode were determined using using PerkinElmer sealed large vial glass standards set P.N. 6008500 verified with NIST stanadard activity. The HSCM values are determined using PerkinElmer low level sealed large glass vial standards set P.N. 6008914 verified with NIST standard activity. No maximum is specified for background.

Safety, Radiated Emissions and Immunity:
The Tri-Carb 2800TR has been tested and approved for safety, radiated emissions and immunity according to the standards of CSA, TUV, IEC1010 and CE93.

In the U.S.A. the CSA approval satisfies the requirements of 29CFR 1910.399.

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